

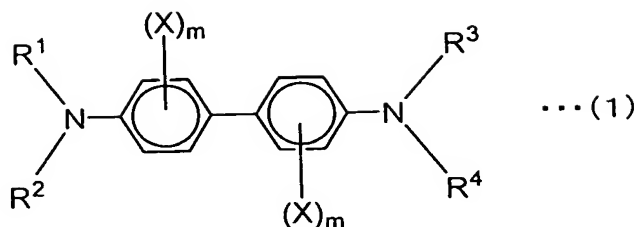
Claims

1. An electronic part device comprising a semiconductor circuit substrate, a semiconductor element
5 mounted thereon in such a way that an electrode part for connection disposed on the semiconductor element and an electrode part for connection disposed on the circuit substrate are facing with each other, and a filling resin layer which fills the gap between the circuit substrate and
10 semiconductor element, wherein the filling resin layer comprises a liquid epoxy resin composition which comprises the following component (D) and the following components (A) to (C):

- (A) a liquid epoxy resin,
- 15 (B) a curing agent,
- (C) an N,N,N',N'-tetra-substituted fluorine-containing aromatic diamine compound, and
- (D) a carboxylic acid vinyl ether addition product.

20 2. The electronic part device described in claim 1, wherein the aforementioned N,N,N',N'-tetra-substituted fluorine-containing aromatic diamine compound as the component (C) is a compound represented by the following general formula (1):

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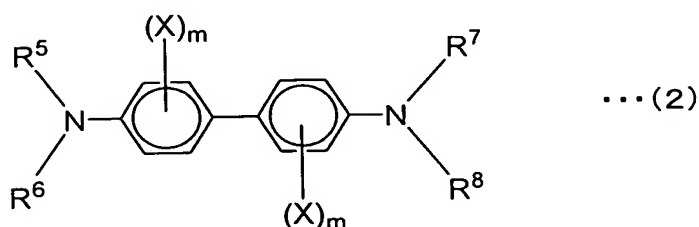


(in the formula (1), X is fluorine and/or C_nF_{2n+1} (n is a positive number of from 1 to 10), m is an integer of from 1 to 4, and R^1 to R^4 are monovalent organic groups other than hydrogen, which may be the same or different from one another).

3. The electronic part device described in claim 1 or 2, wherein the N,N,N',N'-tetra-substituted fluorine-containing aromatic diamine compound as the component (C) is a reaction product of 2,2'-di(trifluoromethyl)-4,4'-diaminobiphenyl with a mono-epoxy compound containing one epoxy group in one molecule.

4. The electronic part device described in any one of claims 1 to 3, wherein the content of the N,N,N',N'-tetra-substituted fluorine-containing aromatic diamine compound as the component (C) is set to a range of from 10 to 70% by weight, more preferably from 20 to 40% by weight, based on the entire organic components of the liquid epoxy resin composition.

5. The electronic part device described in any one of claims 1 to 4, wherein the curing agent as the component (B) is at least one of the fluorine-containing aromatic diamine represented by the following general formula (2) and a derivative thereof:



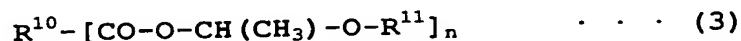
10 (in the formula (2), X is fluorine and/or C_nF_{2n+1} (n is a positive number of from 1 to 10), m is an integer of from 1 to 4, each of R^5 to R^8 is hydrogen or a monovalent organic group, and at least one of R^5 to R^8 is hydrogen).

15 6. The electronic part device described in any one of claims 1 to 5, which comprises a prepolymer prepared by allowing at least one of the fluorine-containing aromatic diamine represented by the aforementioned general formula (2) and a derivative thereof to react with the liquid epoxy
20 resin as the component (A).

7. The electronic part device described in claim 3, wherein the mono-epoxy compound containing one epoxy group

in one molecule is at least one compound selected from the group consisting of n-butyl glycidyl ether, allyl glycidyl ether, 2-ethylhexyl glycidyl ether, styrene oxide, phenyl glycidyl ether, cresyl glycidyl ether, lauryl glycidyl ether, p-sec-butylphenyl glycidyl ether, nonylphenyl glycidyl ether, glycidyl ether of carbinol, glycidyl methacrylate, vinylcyclohexene monoepoxide and α -pinene oxide.

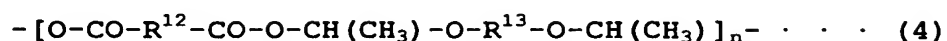
8. The electronic part device described in claim 1, wherein the carboxylic acid vinyl ether addition product as the component (D) is a carboxylic acid monovinyl ether addition product represented by the following general formula (3)



(in the formula (3), R^{10} is an organic group of monovalent or more, R^{11} is an organic group of monovalent or more, wherein they may be the same or different from each other, and n is a positive integer).

9. The electronic part device described in claim 1, wherein the carboxylic acid vinyl ether addition product as the component (D) is a polyvalent carboxylic acid polyvalent vinyl ether addition product having a structural

unit represented by the following general formula (4) as the main moiety



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(in the formula (4), R^{12} and R^{13} are divalent organic groups, wherein they may be the same or different from each other, and n is a positive integer).

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10. The electronic part device described in any one of claims 1 to 9, which further comprises an inorganic filler in the liquid epoxy resin composition containing the components (A) to (D).

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11. The electronic part device described in claim 10, wherein the inorganic filler is a spherical silica powder having an average particle diameter of 10 μm or less.